



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/593,193

09/15/2006

Daisuke Kumaki

0553-0518

9919

26568 7590 02/02/2009
COOK ALEX LTD
SUITE 2850
200 WEST ADAMS STREET
CHICAGO, IL 60606

EXAMINER

BOWMAN, MARY ELLEN

ART UNIT

PAPER NUMBER

2879

MAIL DATE

DELIVERY MODE

02/02/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/593,193	Applicant(s) KUMAKI ET AL.	
	Examiner MARY ELLEN BOWMAN	Art Unit 2879	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 November 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>11/18/08</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

Applicant's arguments filed November 13, 2008 have been fully considered but they are not persuasive. Regarding claims 1-4, 6 and 10-13, Applicant argues that Ishihara fails to teach a substance that transports a hole easily and a substance with an electron accepting property. This argument is not persuasive, because [0048] of Ishihara states, "the hole injection layer has a role of carrying holes [i.e., hole transporting]...it preferably has a high hole mobility...and low in ionization potential [i.e., high electron accepting property]" and [0047] states, "for the hole injection layer [i.e., the hole transport/electron accepting layer]...the possible materials include...molybdenum oxide". Therefore, Ishihara discloses molybdenum oxide a substance that transports holes easily and a substance that accepts electrons easily. The language in claims 1-4, 6 and 10-13 does not requires that there be two separate substances, only a substance that provides both functions. Ishihara therefore discloses the claimed limitations.

Regarding claims 4 and 13, Applicant argues that the green light emitting layer of Peng is closest to the second electro-conductive layer, and therefore Peng does not teach the limitations set forth in claims 4 and 13. However, Peng does teach that the blue light source is closer to the second electrode than the red light source ([0018]). Therefore, "the light emitting layer exhibiting a shorter peak wavelength of emission spectrum [i.e., the blue light emitting layer] is provided closer to the second electrode [than the light emitting layer having a longer wavelength, i.e., the red light emitting layer]", as claimed by Applicant.

Regarding claim 6, Applicant argues that Peng and Ishihara do not disclose the lamination order of the claimed device, however claim 6 does not require a lamination order.

Art Unit: 2879

Claim 6 merely requires various layers within the device to contact other various layers, as disclosed by Peng and Ishihara. Therefore, applicant's arguments regarding claim 6 are not persuasive.

Further Note: Applicant's arguments regarding amended claims 2 and 11 are not persuasive in light of the fact that Ishihara discloses the new limitations as explained below.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1- 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Peng, USP App. Pub. No. 2005/0062405 A1, filed March 3, 2004 (hereinafter referred to as "Peng") in view of Ishihara et al., USP App. Pub. No. 2003/0048072 A1, published March 13, 2003 (hereinafter referred to as "Ishihara").

Regarding claims 1, 3, 4, 5, 10, 12, 13, and 14, Peng teaches a light emitting element comprising: n pieces of light emitting layers (n is a natural number and is at least two) between a first electrode and a second electrode with a higher reflectance than that of the first electrode (e.g., [0022]; "the plurality of emitters 27, 37, 97 [i.e., layer groups] are stacked in turn between the anode 23 and the cathode 29"; Note: The anode is transparent in Figure 4 below and the cathode is metallic); and a first layer containing a substance that transports a hole easily, and a second layer containing a substance that transports an electron easily between the mth light emitting layer (m is a natural number of $1 \leq m \leq n$, and at least two)

Art Unit: 2879

and the $m + 1^{\text{th}}$ light emitting layer (e.g., [0022]; “each emitter 27 (37, 97) composed of a hole transport layer (HTL) 271 (371, 971), emitting layer (EMT) 273 (373, 973), and an electron transport layer (ETL) 275 (375, 975)”), **the second layer being in contact with the first layer** (e.g., Figure 4 below; first layer 371 contacts second layer 275), **wherein a peak wavelength of emission spectrum of the $m + 1^{\text{th}}$ light emitting layer is shorter than that of the m^{th} light emitting layer, and wherein the n pieces of light emitting layers are arranged such that the $m + 1^{\text{th}}$ light emitting layer is placed closer to the second electrode than the m^{th} light emitting layer, and wherein the n pieces of light emitting layers are arranged such that the light emitting layer exhibiting a shorter peak wavelength of emission spectrum is provided closer to the second electrode** (e.g., [0018]; “the individual light sources generated by each of the emitters 27, 37, 97 may be a red light source, a blue light source, and a green light source, respectively”; Note: Blue light has a shorter peak wavelength than red, and is closer to the second electrode).

Regarding claims 2 and 11, Peng teaches a light emitting element comprising: n pieces of layer groups (n is a natural number and at least two) between a pair of electrodes (e.g., [0022]; “the plurality of emitters 27, 37, 97 [i.e., layer groups] are stacked in turn between the anode 23 and the cathode 29”), **each of the layer groups including: a first layer containing a substance that transports a hole easily; a second layer containing a substance that transports an electron easily; and a light emitting layer provided between the first layer and the second layer** (e.g., [0022]; “each emitter 27 (37, 97) composed of a hole transport layer (HTL) 271 (371, 971), emitting layer (EMT) 273 (373, 973), and an electron transport layer (ETL) 275 (375, 975)”), **wherein in the n pieces of layer groups, the first layer included in**

Art Unit: 2879

the m^{th} layer group (m is a natural number of $1 \leq m \leq n$, and at least two) and the second layer included in the $m + 1^{\text{th}}$ layer group are laminated in contact with each other (e.g.,

Figure 4 below; first layer 371 contacts second layer 275).

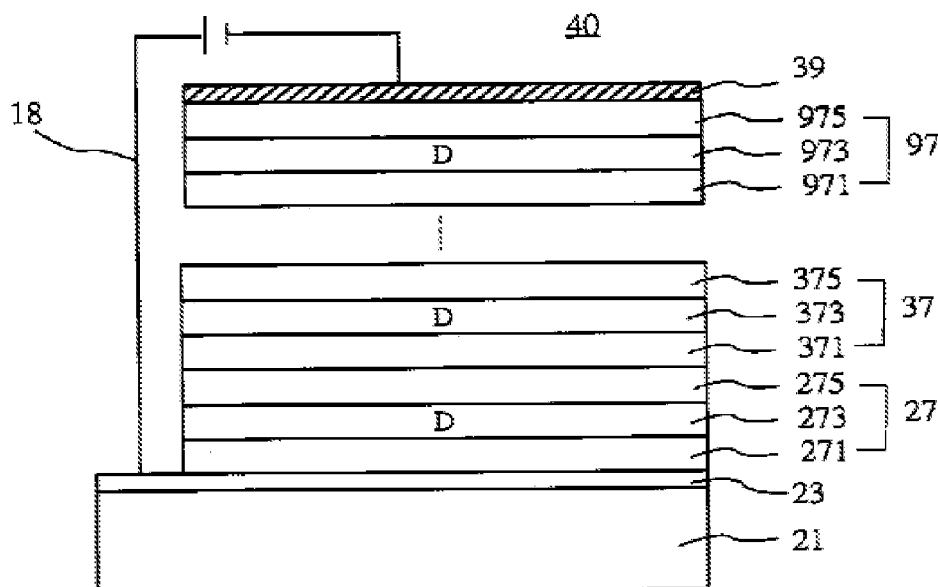


FIG. 4

Regarding claims 6, 7, and 8 Peng teaches a light emitting element comprising: a first layer (e.g., [0023]; “the hole transport layer...371”), a second layer formed in contact with the first layer (e.g., [0023]; “electron transport layer...375”), a third layer (e.g., [0023]; “hole transport layer...971”) and a fourth layer formed in contact with the third layer (e.g., [0023]; “electron transport layer...975”) between a first electrode (e.g., [0017]; “a first electro-conductive layer 23 (for example, anode made from indium tin oxide (ITO) [i.e., a transparent electrode]”) and a second electrode (e.g., [0003]; “a metal cathode 19”), wherein the second electrode reflects light more easily as compared with the first electrode (Note: Metal cathode 19 in Figure 1 below, is depicted as being reflective, while transparent anode 13 is

Art Unit: 2879

depicted as non-reflective), wherein the first layer and the third layer contain a substance that transports a hole easily (e.g., [0023]; “hole transport layer...371,971”), and the second layer and the fourth layer contain a substance that transports an electron easily (e.g., electron transport layer...275, 375”); a first light emitting layer emitting red light between the first layer and the first electrode; a second light emitting layer emitting green light between the second layer and the third layer; and a third light emitting layer emitting blue light between the fourth layer and the second electrode (e.g., Claim 6; “said colorful light sources projected by each of said emitters are individually presented as a color selected from the group consisting of red, blue, green, and the combination thereof”; see Figure 4 above, first and second layers 371 and 275 contact each other and third and fourth layers 971 and 375 contact each other, and emitting elements 272, 373, and 973 lie between them).

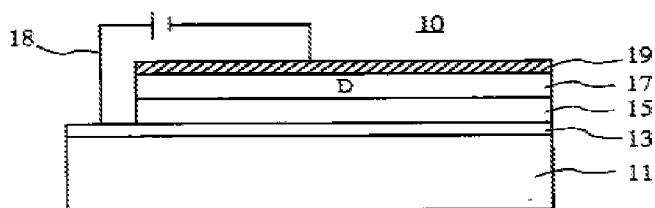


FIG. 1
(PRIOR ART)

Regarding claims 9 and 15, Peng teaches a light emitting device comprising any one of the inventions as explained above regarding claims 1-8 or 10-13 (e.g., [0001]; “an organic light emitting device”).

Regarding claims 1-15, Peng fails to teach the specific properties of the hole and electron transport layers, and further fails to teach both injection and transport layers.

Art Unit: 2879

Ishihara, in the same field of endeavor of a light emitting element, teaches **a first layer containing a substance that transports a hole easily and a substance with an electron accepting property** (e.g., [0048]; “the hole injection layer has a role of carrying holes [i.e., hole transport substance]...it preferably has high hole mobility...and low in ionization potential [i.e., high electron accepting property]”), **a hole transporting layer between the first layer and the light emitting layer** (hole transporting layer 104, [0079]) **and a second layer containing a substance that transports an electron easily and a substance with an electron donating property and an electron transporting layer between the second layer and the light emitting layer** (e.g., [0053-0054]; “electron injection layer is designed to improve the efficiency of injecting electrons from the cathode into the electron transport layer” and “the electron transport layer...has the role of carrying electrons and injecting them into the light emitting layer”) **wherein the substance with the electron accepting property is molybdenum oxide** (e.g., [0047]; “for the hole injection layer [i.e., the hole transport/electron accepting layer]...the possible materials include...molybdenum oxide”).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include a substance with electron accepting properties in the hole transport layer and a substance with electron donating properties in the electron transport layer, because said substances provide the well known benefit of encouraging electrons and holes to travel through the light emitting layer in between the substances, thereby producing light which can be used in an image display device.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MARY ELLEN BOWMAN whose telephone number is (571) 270-5383. The examiner can normally be reached on Monday-Thursday, 7:30 a.m.-6:00 p.m. EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh Patel can be reached on (571) 272-2457. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2879

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/M. B./

Examiner, Art Unit 2879

/NIMESHKUMAR D. PATEL/

Supervisory Patent Examiner, Art Unit 2879